

**GC/MS Studies on the Leaf Essential Oil of *Mikania scandens* (L) Willd.**

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**ABSTRACT**

*Mikania scandens* (L.)Willd. is belonging to the family Asteraceae. This is a wild climber notorious for the pattern of growth which is causing menace to the nearby plants as they climb on them and cut light to the host leaves. Eventhough this plant is wild one with a lot of herbage the economical potentialities are not studied yet. This is an attempt to reveal the phytochemical aspects of the leaf essential oil of *Mikania scandens*. The essential oil obtained by hydrodistillation was used for GC/ MS studies. Fifteen bioactive compounds of great medicinal value were identified.

**Keywords:** *Mikania scandens*, Asteraceae, leaf essential oil, GC/ MS.

**1. INTRODUCTION**

*Mikania scandens* (L.)Willd. is belonging to the family Asteraceae. This is a wild climber notorious for the pattern of growth which is causing menace to the nearby plants as they climb on them and cut light to the host leaves. They finally kill the host plants just like the Kaurava king Dhratharastrar who embraced the statue of Bheemasena, the notorious “Embrace Of Dhratharastrar”. Hence the plant is called “Dhratharastra Pacha” in Malayalam for their pattern of growth and causing threaten to the nearby plants. Eventhough this plant is wild one with a lot of herbage the economical potentialities are not studied yet. This is an attempt to reveal the phytochemical aspects of *Mikania scandens*. The plant for the present study was collected from Avanavanchery of Thiruvananthapuram district. A voucher specimen was identified and deposited in the herbarium of University College, Thiruvananthapuram (PCL. No.10003).

**2. MATERIALS AND METHODS**

Matured leaves of the plant was collected during the early morning. Washed with pipe water and wiped with cheese cloth to remove water. It was later shade dried for a week. The dried leaves were chopped well and was used

for hydro distillation using a Clevenger apparatus at 100 °C for 4 hours. The aromatic essential oils were collected and dried over anhydrous sodium sulphate. The pure oil was transferred into small amber coloured bottles and stored at 4-6 °C.

**3. RESULTS AND DISCUSSION****3.1. GC/ MS Studies of essential oil**

The essential oil sample was analysed in the Varian GC/ MS instrument for 35 minutes. The analysis method used ...er methods\cp.ms. mth. The peak elution with respect to the Retention time was identified by means of the standard software available in laboratory CEPC, Kollam. GC Model number: Varian cp 3800, MC- Pattern Saturn-2200, GC column- Capillary column VS-5ms, Condition – column oven programme 72-300.

**3.2. GC-MS analysis:**

The essential oil composition of *Mikania scandens* (L.)Willd. leaves were chemically identified by GC-MS. Fifteen compounds were identified including 9-Desoxy-acetoxy-3,8-tri-o-acetyl ingol, Naphthalene, 1,2,3,5,6,8a-hexahydro-4,7-dimethyl-1-(1-methylethyl)-, Columbin, 8-acetyl- 5,6-dimethyl-4-oxo-8-nonenoic acid, 8-acetyl- 5,6-

dimethyl-4-oxo-8-nonenoic acid , 9-Desoxo-9-x-acetoxy-7.8.12-tri.o-acetyl ingol, Cubenol, Naphthalene, 1,2,4a,5,6,8a, hexahydro-4,7-dimethyl-1-(1-methylethyl) , 1-Naphthlenol,1,2,3,4,tetrahydro1,6 dimethyl-4-(1-methylethyl), 3-Methoxymethoxy-3-7,16,20-tetramethyl-hencicosa-1,7,11,15,19-pentaene , Docosahexaenoic acid1,2,3 propanetriyal ester , Androst-4-ene-3,20-dione,11,16,22-tric- , 9-Desoxo-9-x-acetoxy-7.8.12-tri.o-acetyl ingol-3-one , Diethyl phthalate , Cyclooctasiloxane, octa decamethyl , Cyclononasiloxane , hexexa decamethyl. (Table:1 and Figure I)

No.	Name of the components	Res type	Quan Ion	Area	Amount/RF
1	9-Desoxo-acetoxy-3,8-tri-o-acetyl ingol	Id.	207.2	6410	6410 Counts
2	Naphthalene, 1,2,3,5,6,8a-hexahydro-4,7-dimethyl-1-(1-methylethyl)-	Id.	119.0	9833	9833 Counts
3	Columbin	Id.	159.2	9935	9935 Counts
4	8-acetyl- 5,6-dimethyl-4-oxo-8-nonenoic acid	Id.	161.2	2499	2499 Counts
5	9-Desoxo-9-x-acetoxy-7.8.12-tri.o-acetyl ingol	Id.	105.0	4513	4513 Counts
6	Cubenol	Id.	119.0	14226	14226 Counts
7	Naphthalene, 1,2,4a,5,6,8a, hexahydro-4,7-dimethyl-1-(1-methylethyl)	Id.	161.2	12996	12996 Counts
8	1-Naphthlenol,1,2,3,4,tetrahydro1,6 dimethyl-4-(1-methylethyl)	Id.	161.2	10281	10281 Counts
9	3-Methoxymethoxy-3-7,16,20-tetramethyl-hencicosa-1,7,11,15,19-pentaene	Id.	121.2	7199	7199 Counts
10	Docosahexaenoic acid1,2,3propanetriyal ester	Id.	93.1	2357	2357 Counts
11	Androst-4-ene-3,20-dione,11,16,22-tric-	Id.	171.2	5455	5455 Counts
12	9-Desoxo-9-x-acetoxy-7.8.12-tri.o-acetyl ingol-3-one	Id.	81.0	569	569 Counts
13	Diethyl phthalate	TIC	1.712e+6	1712060	1712060 Counts
14	cyclooctasiloxane, octa decamethyl	TIC	653414	653414	653414 Counts
15	Cyclononasiloxane , hexexa decamethyl	TIC	654302	654302	654302 Counts

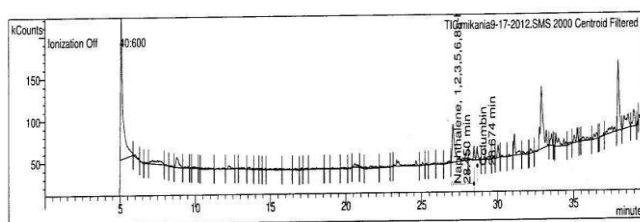
Table-1 GC-MS Target compounds identified

Print Date: 03 Oct 2012 09:45:02

Sample Report for mikania9-17-2012.sms

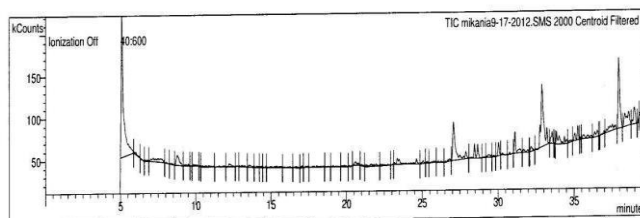
C.E.P.C LABORATORY

Sample ID: mikania  
 Instrument ID: Varian GC/MS #1  
 Acquisition Date: 9/17/2012 6:59 PM  
 Calculation Date: 10/3/2012 9:44 AM  
 Inj. Sample Notes: None  
 Operator: 8/25/2006 6:34 AM  
 Last Calibration: ...mikania9-17-2012.sms  
 Data File: ...er methods/op-ms.mth  
 Method: ...er methods/op-ms.mth



Target Compounds

#	RT	Peak Name	Res Type	Quan Ions	Area	Amount/RF
1	28.450	Naphthalene, 1,2,3,5,6,8	Id.	119.0	9833	9833 Counts
2	28.674	Columbin	Id.	159.2	9935	9935 Counts



Unidentified Peaks

#	RT	Peak Name	Res Type	Area	Amount	R.Match
3	5.083	Diethyl Phthalate	TIC	1.712e+6	1712060	884
4	27.061	No Match	Unk.	382425	382425	----
5	27.889	No Match	Unk.	43048	43048	----
6	28.456	No Match	Unk.	82875	82875	----
7	31.122	No Match	Unk.	125329	125329	----
8	32.764	No Match	Unk.	115935	115935	----
9	32.891	Cyclooctasiloxane, hexadecam	TIC	653414	653414	804
10	33.210	No Match	Unk.	44976	44976	----
11	37.948	Cyclononasiloxane, octadecam	TIC	654302	654302	794
12	38.335	No Match	Unk.	132703	132703	----
13	38.606	No Match	Unk.	206246	206246	----
14	38.971	No Match	Unk.	192198	192198	----
15	39.519	No Match	Unk.	97829	97829	----

Figure 1: GC/MS Graph of leaf essential oil of Mikania scandens

The bioactive compounds found in the essential oil detected during the GC/MS analysis were believed to be the anthelmintic and antimicrobial agents. This kind of observations were obtained by the previous workers on allied genera. The essential oil of Mikania scandens contain several terpenoid compounds and majority of them showed very promising results in the previous works also. Columbin found in the essential oil of Aristolochia albida was a diterpenoid furanolactone which inhibited growth of culture forms of Trypanosoma brucei and showed complete lysis of the parasite with 10-20 minutes. The total amount of cholesterol in blood was diminished dose dependently in the presence of 10-100 micro g/ml of columbin after three day incubation period in mice<sup>1</sup>. Columbin obtained from Tinospora bakis showed anti-inflammatory effects is in in vitro, in vivo and in silico studies on human liver cells and proved it as a potential anti-inflammatory drug<sup>2</sup>.

The other compounds detected include Cubenol showed antibacterial, antifungal activities in the works done previously by some authors<sup>3,4,5</sup>. The similar results were obtained during the present investigation as the androsteredione identified during GC/MS was a 19-carbon steroid hormone produced in the adrenal glands and the gonads as an intermediate step in the biochemical pathway that produces the androgen testosterone and the estrogens estrone and estradiol. It is the common precursor of male and female sex hormone<sup>6</sup>. It is observed during the present study the essential oil of *Mikania scandens* contains androsteredione in high amount that can be used for the preparation of drug after extraction. Ingol diterpene compounds were also found which were proved as antitumourous agent by previous workers<sup>7,8,9</sup>.

#### 4. CONCLUSION

The present study revealed that the leaf essential oil of *Mikania scandens* contains a number of bioactive principles which are of great medicinal value. They are proved as antibacterial, antifungal and anthelmintic agents that can be used in the preparation of various medicines.

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Conflict of Interest: None Declared

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